

PORTLAND FIRE WEATHER – 2011 ANNUAL REPORT

2011 FIRE SEASON OVERVIEW

The 2011 fire season for Northwest Oregon and Southwest Washington was fairly quiet, continuing a 3-year trend. La Nina conditions persisted through the 2010-2011 winter, started to wane in late-spring, but then showed signs of strengthening again in mid-summer. This resulted in above-normal November precipitation, with abundant snowfall in the Cascades. La Nina was most evident in the spring, with well above-normal precipitation in March and April. The Cascade snowpack reached a maximum in March. Cool and wet conditions persisted from May through early July, with numerous onshore flow events and a persistent upper level trough over the Northeast Pacific. The wet spring and early summer raised concern that increased grass and brush fuel loadings would pose a heightened fire concern once those fuels cured. Climatological summer in the Pacific Northwest started late, generally in late-July. A significant wetting rain period in mid-July further delayed the onset of fire season across the forecast area. Typically, fuel conditions approach or exceed critical levels by late July. Energy Release Component (ERC) and 100-hour fuel moisture values were well behind seasonal normal values at the end of July. Conditions more akin to typical Pacific Northwest fire weather started to develop in early August. The 2011 fire season was somewhat unusual. In late-July it appeared the Pacific Northwest would not have a fire season at all, similar to 1995. However, in August fire weather conditions changed dramatically. In a 3-week period, overall fuel conditions went from several weeks behind normal to critical. The Cascade zones, especially the Central Oregon Cascades and foothills, exceeded 97th percentile ERC values in early September. The most critical fire weather period covered late-August through about September 11th, an extremely short time frame compared to previous years. Typically, fire season in Northwest Oregon and Southwest Washington lasts about two months, from mid to late-July through mid-September.

The most extreme fuel conditions occurred the first two weeks of September. Hot and dry conditions developed in late-August, which resulted in an accelerated drying of fuels. A lightning outbreak on August 24th and 25th resulted in hundreds of fire starts in the Cascades. The lightning episode was immediately followed by several days of hot and dry conditions, and a plethora of critical fire weather concerns. An offshore event occurred September 3rd, followed by a 4-6 day period of Haines 6 conditions. As quickly as critical fire weather conditions developed, a return to benign fire weather occurred just as fast. Onshore flow and bouts of light precipitation in mid-September was the start of a quick down-turn in fire weather severity. Although September was generally warmer and drier than normal, ERC values showed a big decline. For example, the Coast Range zones 602 and 603 had an average ERC of 45 at the beginning of September, well above the 97th percentile. Average ERC values at the end of September dropped below 25. The average ERC in zones 606 and 608 did not experience such a dramatic decrease. ERC values remained above 40, at or above the 85th percentile, through September.

The district had four significant fires, all starting around August 24th during a lightning outbreak. The Dollar Lake Fire occurred in the Barlow Ranger District of the Mt. Hood National Forest. The Shadow Lake Fire started about 15 miles west of Sisters in the Deschutes National Forest, but eventually spread to the McKenzie District of the Willamette National Forest. The Mother Lode Fire occurred in the Bull of the Woods Wilderness section of the Mt. Hood National Forest. Finally, the Substitute Fire started

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14 miles southeast of McKenzie Bridge in the Three Sisters Wilderness part of the Willamette National Forest.

Three Red Flag events occurred during the season, similar to last year. The two warned events took place in early September and were separated by one day. The missed event was the late-August lightning episode. The first warned Red Flag event started as a dry and unstable, or Haines 6, cause, but ended as a combination of wind/low humidity and Haines 6 conditions. The initial warning was issued at 906 PDT on September 3rd. The warning was updated at 1110 PDT to include wind and low humidity, as Red Flag conditions were occurring at the time. The second warned event spanned a period of 5 days, and was issued for a multitude of fire weather concerns. The initial warning was sent at 846 PDT on September 6th. The final update was issued at 555 PDT on September 12th. A total of 12 warnings were issued in 2011 compared to 9 last year. However, there were five missed warnings.

The pre-season precipitation was above average in most locations, with amounts generally 100 to 125 percent of normal. La Nina conditions prevailed from November through July, resulting in well-above normal spring precipitation, especially in the North Willamette Valley, North Oregon Cascades and foothills, and the South Washington Cascades and foothills. For example, the average March precipitation for Alsea Falls-Fall Creek fish hatchery is 10.29 inches, but 19.05 inches fell during the month. The Portland airport set a record for the most precipitation in the two-month period March 1st through April 30th. The Cascades had a good start to the snow season, as November storms produced several feet of accumulation. By the end of February, Cascade snowpack had fallen to 85-90% of normal. The Government Camp snow depth fell from 34 inches on January 1st to just 5 inches at the end of the month. The snow depth fell to zero on February 10th. Frequent storms from late-February through March brought the Cascade snowpack over 150% of normal.

The wet pattern from late-spring through mid-summer kept overall fuel conditions several weeks behind seasonal norms. At the end of July, average ERC values ranged from near 10 in the coastal strip zones, to 20 in the Central Cascades and foothills. Last July, the average ERC was near 30 for zones 601 and 612, and over 40 in the Central Cascades. ERC values experienced a rapid rise in August and early September, generally exceeding 97th percentile values September 1-10. The most critical fuel conditions for the Cascades occurred around September 10th, when the average ERC was just above 50. The highest daily average for zones 606 and 608 was 60 on September 11th. Emigrant RAWS peaked at 77, and was above 70 for 12 days, nearly twice as many as last year, despite a much shorter peak fire season. September turned out warmer and drier than normal, but by the end of the month average ERC values had fallen to 15-25 in most areas, except the Central Cascades where the average ERC remained above 40. A series of wetting rain events in early October put an end to the season. Yellowstone RAWS, in zone 606, received 2.29 inches of rain in the period October 2-5. The average ERC for zones 606 and 608 fell from 42 on September 30th to 12 on October 10th.

The district experienced well below-normal lightning activity in 2011. This was especially true for zones 604, 606, and 608. The Willamette Valley usually averages about nine lightning days from May through early October. The 2011 total was just 5.

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The Central Cascades average about 18 lightning days, but only had 8 this year. The overall large-scale weather pattern was a primary reason for the lack of lightning across the forecast area. There were several cases when moist and unstable south flow aloft spread into the Umpqua and Rogue River National Forests, but then encountered a slightly more stable west component in the south end of the Willamette National Forest. Persistent southwest to west flow prevailed over the north half of the district, severely limiting the lightning threat. The Coastal strip zones were nearly devoid of lightning, with just one lightning day.

Red-Flag criteria remained unchanged for the 2011 season. The concept of problematic lightning devised by the Northwest Coordination Center continued to be used. Its main premise was to develop Red-Flag criteria highly dependent on current and forecast fuel conditions before, during, and after a significant weather event. The idea was to move away from the subjectivity inherent in the dry lightning concept, or the idea of using specific rainfall criteria. The new criteria provide a better means of verification. Considerable attention continues to be directed at Haines 6 patterns, specifically, surface thermal trough passages. The primary focus has shifted to the mid-level Haines, instead of the high-level Haines. In the past several years, surface thermal trough passages have been responsible for extreme fire behavior resulting in significant fire growth on existing fires. Dry and unstable conditions brought the Gnarl Ridge Fire of 2008 back to life in mid-September, after about four weeks of inactivity. The Cold Springs fire in 2008 exhibited significant nocturnal fire growth due to the presence of a surface thermal trough and associated subsidence inversions. This was also the case for the Tumblebug Complex in September of 2009.

A major fire is defined as an incident that is at least 100 acres or requires at least a Type II management team. The forecast district experienced three large fires in 2011, which is about average for any given year. A fourth fire, the Substitute Fire, employed the use of a Type III management organization. In 2008 there were four large fires, and in 2007 there was one large fire.

It was a relatively quiet year for the Portland Incident Meteorologists (IMETS). The IMETS provided service on four incidents. The last dispatch, deployment in Southeast Texas, occurred in late October.

Despite a relatively quiet fire season and a nearly complete lack of spring burning, there were nearly twice as many spot requests this year compared to 2010. The dry fall provided ample opportunity for agencies to conduct prescribed burning activity. Spot forecast requests continued into the first half of November. There were 222 spot forecast requests in 2011, compared to 120 in 2010. There were 93 wildfire spot requests this year versus 51 last year. Prescribed spot requests in 2011 were up substantially from 2010. The forecast office received 114 prescribed burn spot requests, compared to 61 last year. One of the main contributors to the prescribed burn total was the US Fish and Wildlife Service with 24 spots. Eugene BLM contributed another 20 spot requests. The USFS was the primary source of prescribed burn spot requests with 58. Usually the Willamette NF has the most prescribed burn spot requests. This year the Mt. Hood NF took top honors with 29 requests, compared to 23 for the Willamette NF. The Mt. Hood NF also had the most wildfire spot requests with 49. The Substitute Fire, in the Three

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Sisters Wilderness area of the Willamette NF did not reach Type II Management Status, but accounted for 18 wildfire spot forecast requests. City and county emergency management have become more involved in the spot forecast process, especially in non-fire situations. Search and Rescue (SAR) requests are becoming more prevalent, as well as requests for local fire and fire academy training exercises.

September and October were busy months for spot forecasts, with a total of 149, or 67 percent of the seasonal total. Seventy-seven of the 93 wildfire spot requests occurred in September. Favorable October burning conditions resulted in 40 prescribed burn requests. There were 14 spot requests in November, an unprecedented amount.

Training and outreach remain a significant part of the fire weather program at the Portland office. The staff taught numerous classes, conducted office tours, and gave several presentations to a wide range of users. Outreach activities began as early as mid-December 2010 and continued through November 2011. The Portland office continues to provide assistance to some of its former east-side users as well, primarily Central Oregon Community College.

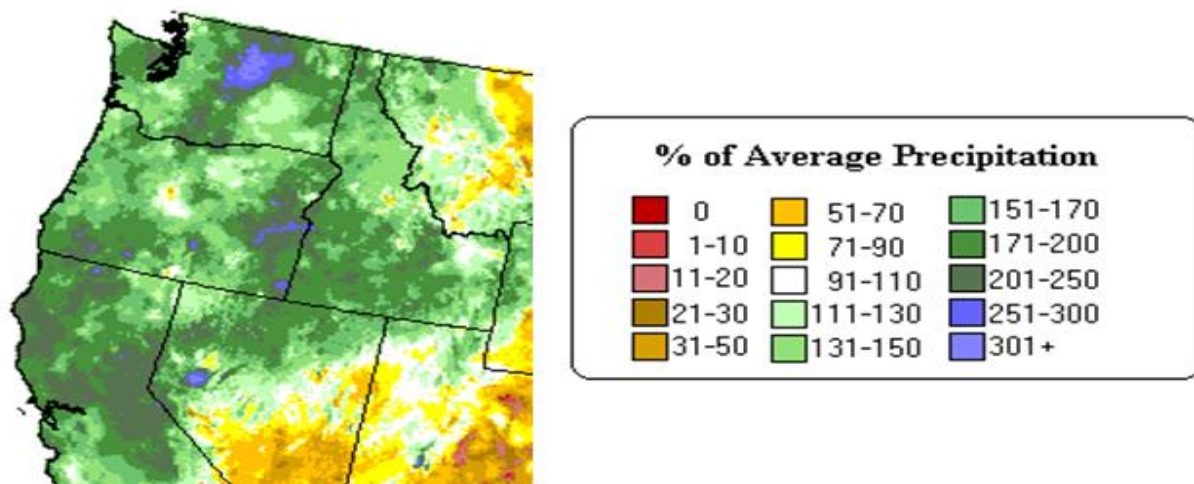


FIGURE 1 – PORTLAND FIRE WEATHER DISTRICT

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2011 PRE-SEASON: PRECIPITATION

Table one (page 8) shows precipitation amounts for various locations from fall through spring. Winter 2010-2011 was a classic La Nina event. Note the wet November and December, followed by generally below-normal precipitation in January and February. March and April rainfall was well-above normal throughout much of the region. La Nina conditions started to wane through late spring and early summer. Overall, nearly all areas ended up with above normal precipitation for the period November through May. March was abnormally wet, with many areas receiving 150% or greater than normal, as shown in Figure 2 below. Newport received 11.73 inches, or 3.99 inches above average. The Alsea-Fall Creek station had just slightly over 19 inches in March, nearly double the monthly normal. Figure 3 (next page) shows the basin snowpack averages at the end of March. SNOTEL sites in the Cascades and foothills were at 110% or above the average snowpack for the end of March. April was another wet month, with abundant snowfall in the Cascades. The 11.47 inches of rain at the Portland airport from March 1st through April 30th was the highest two-month total for that period on record. During the two-month period, the Portland airport had measurable rainfall on 49 of the 61 days. Government Camp measured 14.24 inches of water-equivalent in April, nearly doubling the monthly average of 7.54 inches. SNOTEL sites in the Willamette, Hood, Sandy, and Lower Deschutes Basins had snow-water equivalent values of 170% or greater than normal at the end of April. These values were even higher than those of 2010. Government Camp had a snow depth of 30 inches on April 30th.



MARCH 2011 PRECIPITATION ANOMALY

FIGURE 2 – MARCH 2011 PRECIPITATION ANOMALY

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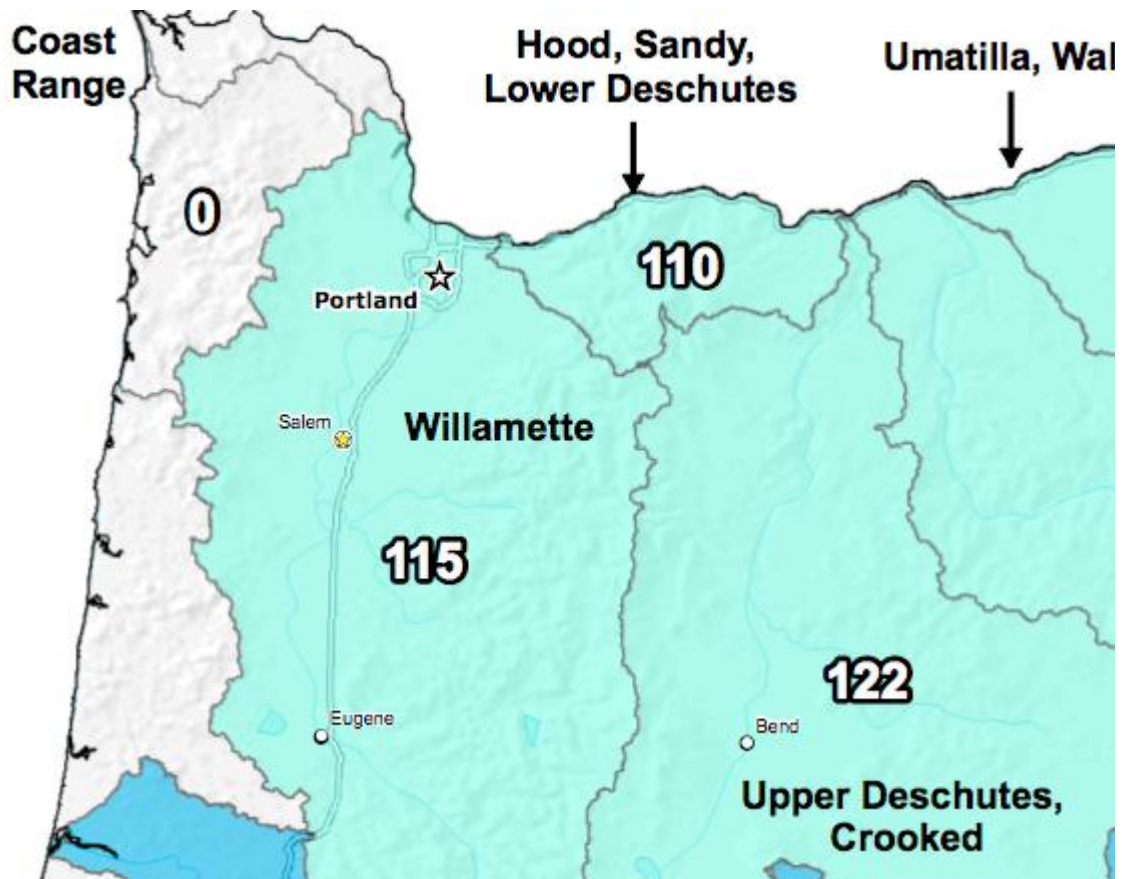


FIGURE 3 – PERCENT OF NORMAL SNOWPACK MARCH 31, 2011

WET MEMORIAL DAY 2011: May 2011 ended with an abnormally wet period. The coastal zones, 601 and 612, registered 5 wetting rain days during the period May 21-31. Wetting rain occurred on Memorial Day, May 30th, over much of the coastal and coast range zones. The following are rainfall amounts for the day:

GOODWIN	0.57
VILLAGE CREEK	0.47
CEDAR CREEK	0.45
HIGH POINT	0.41
ROCKHOUSE	0.34
RYE MOUNTAIN	0.32

In addition, wetting rain fell in the Central Oregon Cascades and foothills, zones 606 and 608.

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Figure 4 (below), shows the Standardized Precipitation Index (SPI) for the period March through May 2011. The SPI indicates the number of standard deviations away from the mean average. The North and Central Willamette Valley and interior Southwest Washington showed 2.0 to 2.5 standard deviations above normal, with a maximum of 3.0 or greater in portions of the South Washington Cascade foothills.

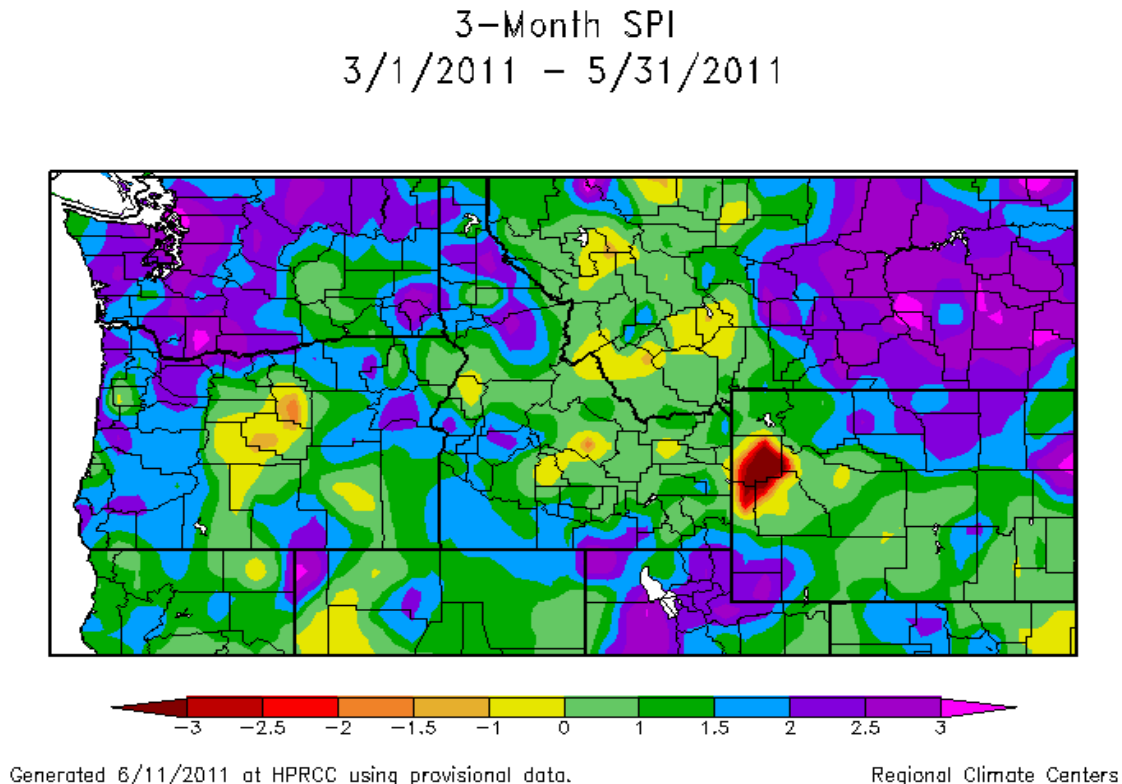


Figure 4 – March-May 2011 Standardized Precipitation Index (SPI)

Snowfall came early and often to the Cascades in mid to late fall. Figure 5 on page 14 shows the Government Camp seasonal snow depth. Government Camp had a little over four feet on the ground at Thanksgiving, and 60 inches at the end of November. The 60-inch depth on November 30th would be the highest snow depth until early March 2011. The snowpack held steady in December, generally ranging from 25 to 35 inches. Snowpack declined in January through the first three weeks of February. In fact, the snowpack dropped to zero on February 11th and 12th. By the end of February, the snowpack had jumped to 48 inches. The greatest measurable snow depth was noted on March 1st, at 66 inches. The snow depth fluctuated between 30 and 45 inches during the remainder of March. Despite the wet April, the snow depth diminished to 20 inches by the 20th. In early May the snow depth remained around 20 inches, but dropped to single-digits on the 10th, and finally went to zero on the 18th.

The wet spring severely curtailed prescribed burning projects. The Portland Office received just four spot forecast requests from April 1st to May 31st, and 2 of those were for various orchard spray applications. The abundant rainfall raised concerns about

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increased grass and brush fuel loadings that could become problematic after curing. Classic La Nina characteristics prevailed through June and into the first half of July. Fuel conditions by mid-July were several weeks behind seasonal normal, but managed to catch up in mid to late August. Daily average ERC and 100-hour fuel moistures reached critical levels in late August through about September 11th.

The 2011 season was another below-average lightning year. Typically, the Central Oregon Cascades, zone 608, endures about 20 lightning days during the May-early October period. In 2011 there were just 8 lightning days. The Portland Office did not issue a Red Flag Warning in 2011 solely for lightning. However, a lightning episode on the 24th and 25th resulted in hundreds of fire starts, a few of which became large fires. Similar to 2010, there were just two warned Red Flag events, both in early September and separated by one day. Overall, in July it appeared the region would have one of the quietest fire seasons in many years. Despite the abrupt shift to critical fire weather conditions in late August, the fire season was cut short in mid-September by an increase in onshore flow. The typical two-month fire season was whittled to about four weeks.

TABLE 1 - 2010-2011 WET SEASON PRECIPITATION SUMMARY

	NOV	DEC	JAN	FEB	MAR	APR	MAY	TOT	AVE	PCT AVE
Astoria	12.45	11.37	12.20	7.42	11.85	8.01	4.04	67.34	53.71	125.38%
Newport	10.17	13.52	8.69	5.68	11.73	7.77	3.49	61.05	57.47	106.23%
Fall Creek	13.04	19.54	11.52	11.57	19.05	11.89	3.91	90.52	78.34	115.55%
Portland	6.63	8.35	4.73	4.29	6.43	5.04	2.92	38.43	28.98	132.61%
Eugene	5.91	6.78	2.05	4.91	6.24	3.78	2.63	32.30	42.35	76.27%
G. Camp	13.44	15.18	13.00	8.34	12.65	14.24	6.52	83.37	71.40	116.76%
Oakridge	6.58	10.04	4.62	4.61	8.57	5.91	4.61	44.94	37.34	120.35%

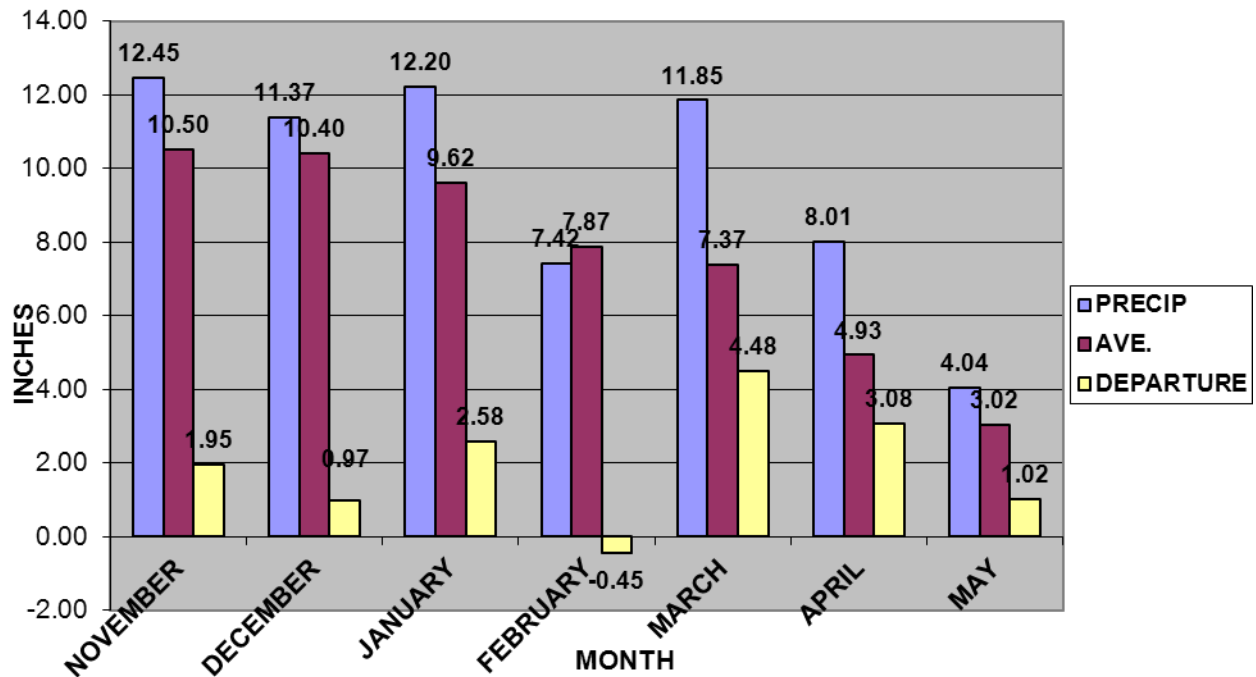
FAST FACTS: MID-JULY WETTING RAIN EVENT

An unusual mid-July closed upper-level low parked over the Pacific Northwest resulted in significant rainfall from the 15th through the 18th. Rainfall amounts for the 17th included:

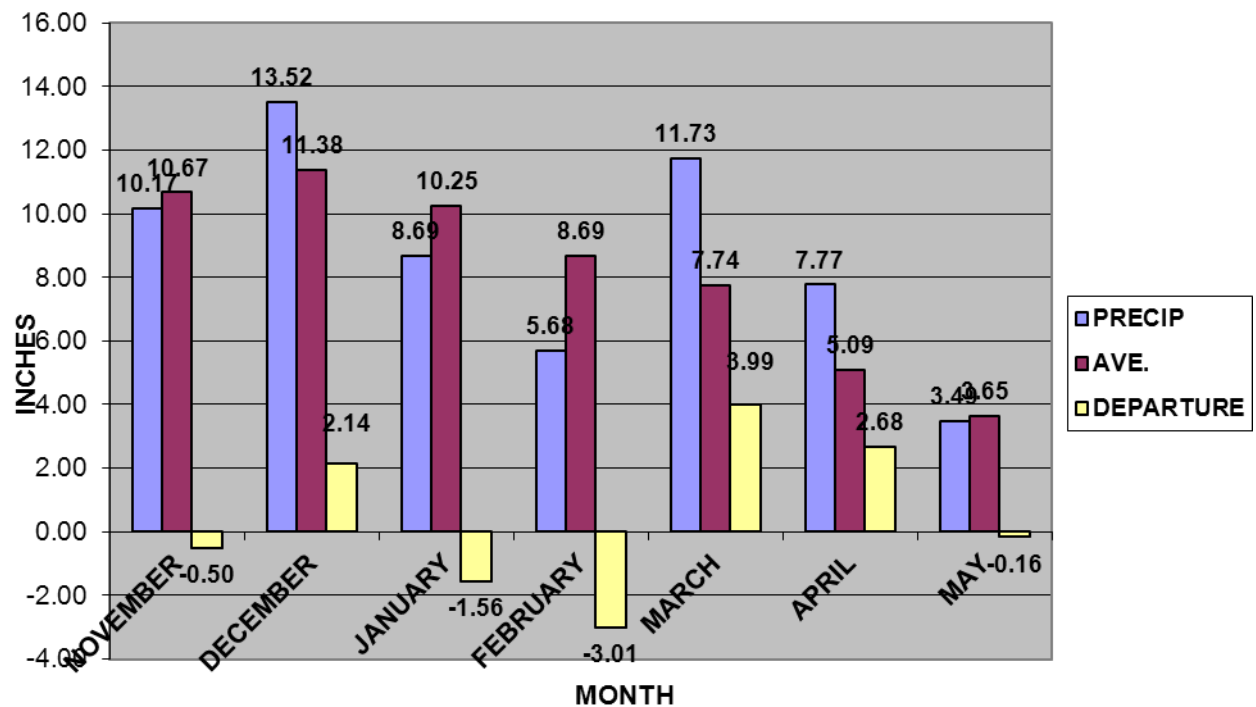
<i>Wanderer's Peak</i>	<i>0.92 inches</i>	<i>3-Corner Rock</i>	<i>0.77 inches</i>
<i>Willow Creek</i>	<i>0.68 inches</i>	<i>Horse Creek</i>	<i>0.66 inches</i>
<i>High Point</i>	<i>0.65 inches</i>	<i>Elk Rock</i>	<i>0.61 inches</i>
<i>Eagle Creek</i>	<i>0.54 inches</i>	<i>Canyon Creek</i>	<i>0.48 inches</i>
<i>Trout Creek</i>	<i>0.45 inches</i>	<i>Pebble</i>	<i>0.41 inches</i>

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2010-2011 WET SEASON ASTORIA

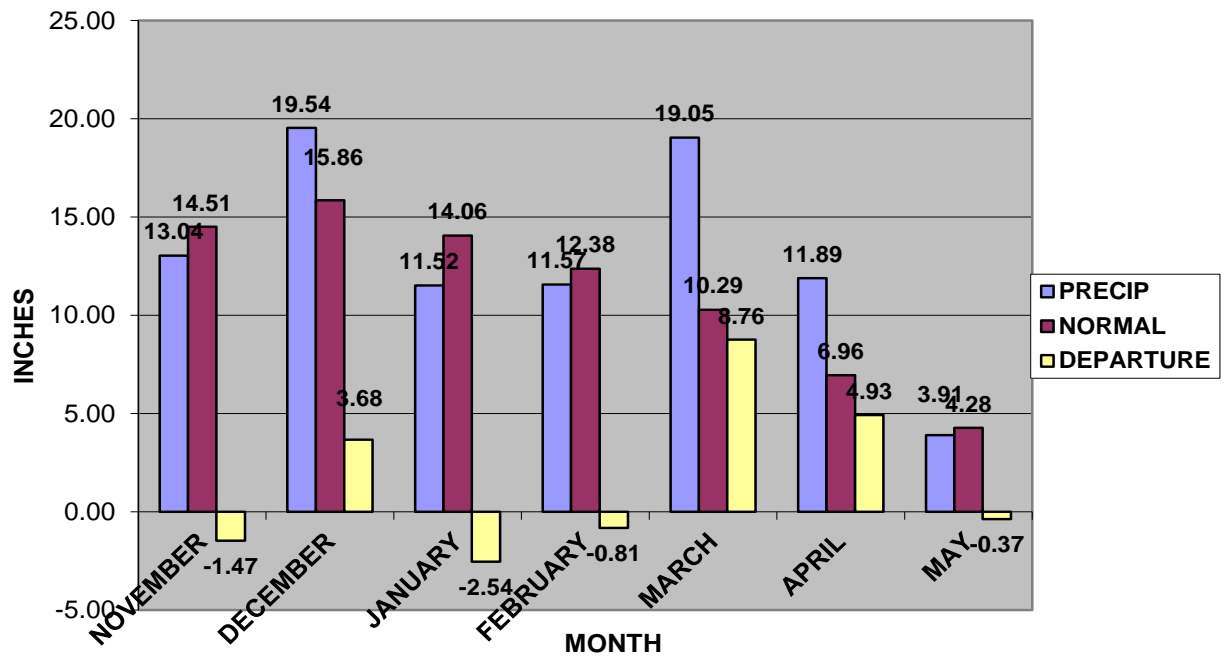


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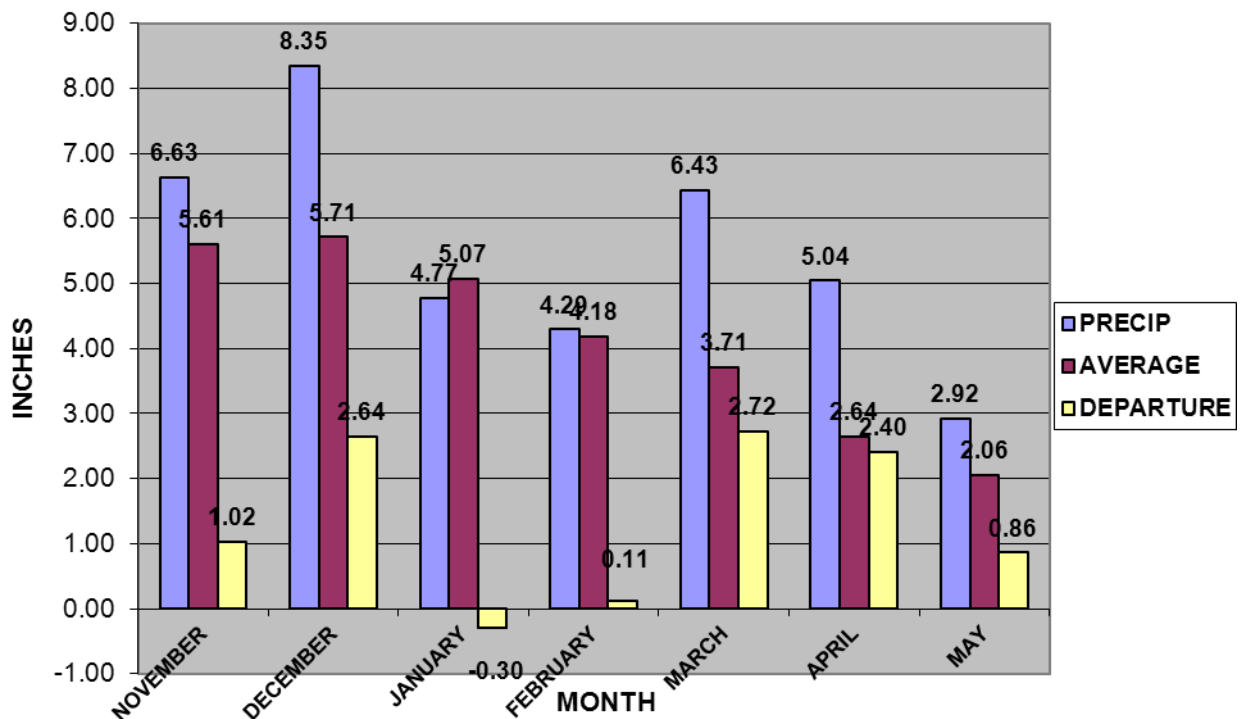


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2010-2011 WET SEASON ALSEA-FALL CREEK

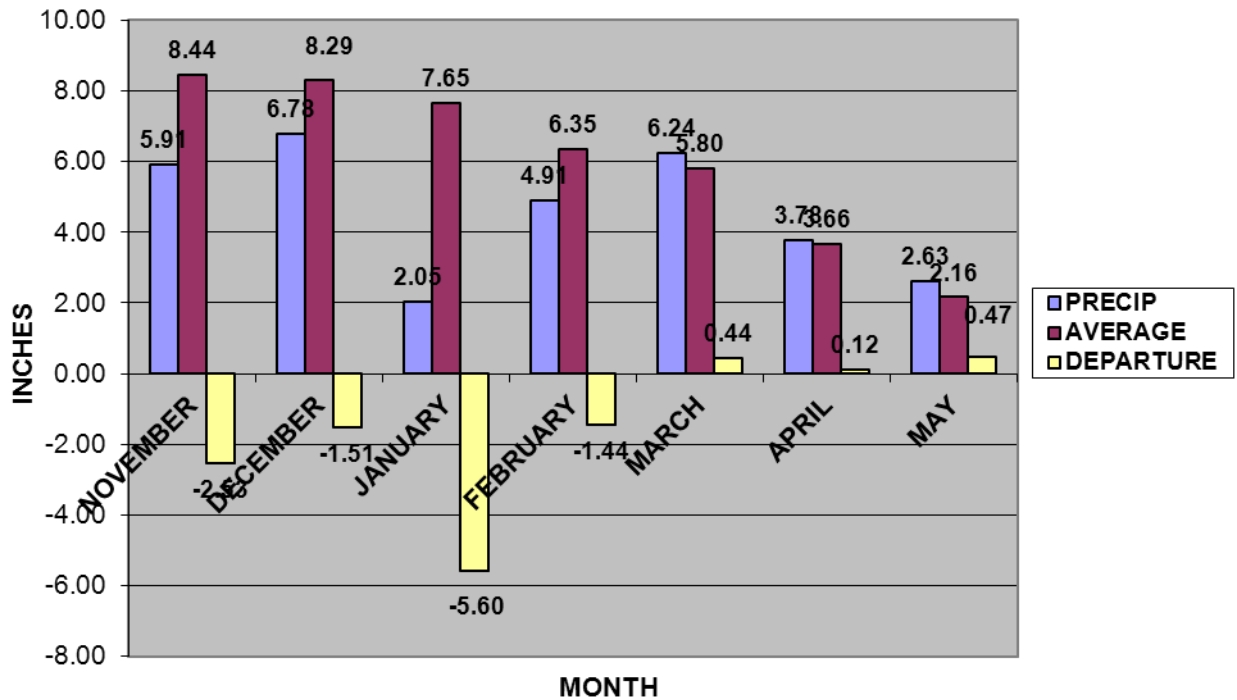


2010-2011 WET SEASON PORTLAND



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2010-2011 WET SEASON EUGENE



2010-2011 WET SEASON GOVERNMENT CAMP

